STATISTICAL BULLETIN
Metropolitan Life Insurance Co.

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WHY AND WHERE TEETH DECAY

A perfect set of teeth is among the rarest of natural phenomena. Among nearly twenty thousand Home Office employees of the Metropolitan Life Insurance Company who have received dental examinations in the last twelve years, only two sets of perfect teeth have ever been found. This fact is one of the by-products of the systematic statistical study of dental conditions carried out by Dr. T. P. HYATT, Director of the Dental Division, with the collaboration of the Statistical Bureau of the Company. This study has revealed many interesting facts. Decay of teeth is not a matter of chance. Certain teeth, and certain particular surfaces of these teeth, are far more susceptible than others. This appears very clearly from the statistics, and the significant fact is that the surfaces found statistically to be especially subject to decay are the very surfaces which are known to dentists to have naturally weak points in their enamel—pits and fissures that exist from the time the tooth is formed. It is in these natural crevices that bacteria find an ideal breeding place and produce dental decay. So marked is this feature that it has even been recommended that such natural pits and fissures should be cut and filled before any decay ever appears in them. At any rate the knowledge that decay appears constantly in specific locations should be a distinct aid to those in whose care rests a program of preventive dental hygiene.

Some of the results of the periodic examinations of the Metropolitan Home Office employees are exhibited in the table on page 2 and the chart on page 3. The table shows, for each of the five surfaces of the different teeth, the number of cavities that were found, per 100 erupted teeth. Teeth that had failed to erupt from the gums (a common condition especially for some of the teeth at the back of the mouth) were left out of reckoning, since they, obviously, are not exposed to decay, if present at all. On the other hand, for purposes of numerical computation, missing teeth—that is to say, teeth that

had been present but had been extracted, or that were decayed beyond recognition of individual cavities—were allowed for on a *pro rata* basis, charging them with the same number of cavities as were actually found, on an average, in the teeth of the same type that were still in the mouth.

Susceptibility of Teeth to Decay. Males and Females Under 25 Years of Age. Metropolitan Life Insurance Company. Examination of 2,943 Persons. Cavities per 100 Erupted Teeth. (Corrected for "Missing" Teeth)

Teeth	Total Surfaces	Lingual	Buccal	Mesial	Distal	Occlusal
Centrals	33.3	1.5	.8	16.6	13.6	.8
Laterals	30.7	5.5	1.0	16.3	7.1	.7
Cuspids	14.3	1.0	1.9	4.3	6.2	.9
1st Bicuspids	50.0	.7	2.3	6.1	12.8	28.1
2d Bicuspids	72.2	.7	2.3	11.2	15.4	42.6
1st Molars	180.3	18.8	26.6	14.3	6.0	114.6
2d Molars	134.7	6.2	18.5	4.1	2.9	103.0
3d Molars	82.0	1.3	12.4	1.6	1.3	65.5

For the general reader not acquainted with the technical terms of dentistry an explanation of some of those that appear in the table and chart may be desirable. The five surfaces of a tooth are described as follows: *buccal*, the surface turned toward the lips or the cheeks; *lingual*, the surface turned toward the tongue; *mesial* and *distal*, the surfaces contacting with an adjacent tooth, the mesial being the one nearer the median line of the jaw, distal that farther removed; *occlusal* is the biting surface.

The outstanding fact brought out by the table is that the occlusal surfaces of the first and second molars, both upper and lower, are by a large margin the most susceptible to decay. The first and second molars actually *average* more than one occlusal cavity per tooth! The occlusal surfaces of the two upper bicuspids also have a high susceptibility, though less than half that of the first and second molars. The first bicuspid of the lower jaw, on the other hand, is fairly resistant on the occlusal surface. All these facts can be easily

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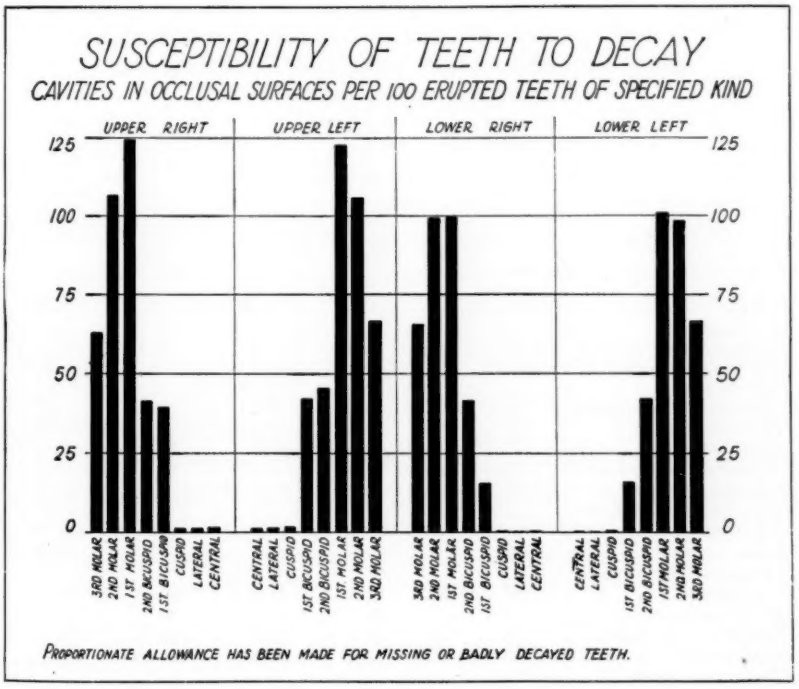
read off the accompanying graph, which shows only the figures for the occlusal surfaces. Of surfaces other than the occlusal, the only ones that rise to the level of 50 per cent. susceptibility are the buccal surfaces of the lower first molars.

The incisors (central and lateral, that is, the eight front teeth) are relatively resistant. What cavities they have fall almost exclusively on the mesial and distal surfaces; the lingual surfaces of the upper laterals, however, also rise above the general level of the otherwise rather resistant surfaces of the front teeth.

As to the third molars, it should be pointed out that all the persons included in this compilation belonged to a young age group (under 25 years), and that therefore the third molars (wisdom teeth) had not long been exposed to decay.



DEATHS FROM TUBERCULOSIS IN DUSTY TRADES

Certain trades and occupations in which the workers are exposed to dust show much higher percentages of deaths from tuberculosis than do occupied males as a group. Notable among these occupa-

tions are miners (except coal miners), pottery workers, stone cutters and others. These facts are brought out by the analysis now being made of causes of death, by occupations, among white male Industrial policyholders of the Metropolitan Life Insurance Company (covering the years 1922 to 1924). The proportion of deaths from tuberculosis for miners (except coal miners) exceeds the average for all occupied males by 83 per cent., at the main working ages of life, 15 to 64 years. Pottery workers show an excess of 77 per cent., while stone cutters exceed the average by 44 per cent. Other occupations which in the past have experienced a high mortality from tuberculosis, show in this study percentages somewhat less excessive than those we have mentioned.

Percentage of Deaths Due to Tuberculosis of the Respiratory System of Deaths from All Causes in Specified Occupations. Mortality Experience of Metropolitan Life Insurance Company on White Male Industrial Policyholders, 15 Years and Older, 1922 to 1924.

OCCUPATION OR INDUSTRY	DEATHS (15 YEARS AND OLDER)		PER CENT. OF DEATHS FROM TUBERCULOSIS			Standardized Ratio * Ages 15–64 Years
	All Causes	Tuberculosis	Crude for Ages 15 Years and Older		Standardized for Ages 15–64	
			1922–1924	1911–1913‡	1922–1924	1922–1924
All Occupations Combined	105,467	14,172	13.4	20.2	16.2	100.0
Miners (except coal miners)	225	65	28.9	28.0	29.6	182.7
Pottery workers	201	53	26.4	29.9	28.6	176.5
Stone cutters	375	73	19.5	27.6	23.4	144.4
Waiters and hotel servants	789	174	22.1	†	22.8	140.7
Cutlers and grinders	136	20	14.7	25.7	22.0	135.8
Cigar makers and tobacco workers	508	53	10.4	23.7	21.9	135.2
Laundry workers	187	38	20.3	28.0	21.8	134.6
Compositors, printers and pressmen	937	201	21.5	35.0	21.2	130.9
Brass foundry workers	157	27	17.2	31.1	20.5	126.5
Barbers and hairdressers	768	117	15.2	26.1	20.4	125.9
Glass workers	323	60	18.6	28.3	20.0	123.5
Clerks, bookkeepers and office assistants	5,140	1,165	22.7	34.8	19.9	122.8
Polishers (Iron and steel products)	105	22	21.0	29.7	19.8	122.2

*The percentage of deaths (16.2) shown in column 5 for all occupations combined was taken as 100. The standardized percentage for each occupation divided by 16.2 gives the standardized ratio.

†Not available.

‡First 6 months of 1911 excluded.

Seventy-two occupational classes were included in the analysis. Of these, 37 have a higher proportion of deaths from tuberculosis than the average for all occupied males. Thirteen classes have percentages which exceeded the average by 20 per cent. or more. The table on page 4 shows for these thirteen classes the proportion of deaths from tuberculosis for the years 1922 to 1924 and 1911 to 1913.

Silica dust is the predominant hazard discernible in five of the thirteen occupations, namely, miners (other than coal miners), pottery workers, stone cutters, cutlers and grinders, and polishers. The silica dust hazard also probably accounts for part of the excessive mortality of glass workers and some brass foundry workers. The cause of the high mortality among compositors and tobacco workers is not clear. The specific hazards of lead absorption in the case of the former and tobacco poisoning with the latter have been suggested as possible explanations, but these hazards are not sufficient to account for the very considerable excess found for these workers. Faulty posture, which restricts free movement of the chest, plays an important part in the pulmonary disease of certain groups of sedentary workers, particularly cigar makers, who constitute a large portion of the tobacco workers. Furthermore, men physically unable to carry on other pursuits frequently select these sedentary occupations. Consequently, the mortality from tuberculosis is weighted by the excessive mortality among these workers. Work under unfavorable conditions of high heat, particularly if associated with high humidity coupled, as it so often is, with alternate exposure to cold, may be responsible in large measure for acute respiratory disease which, in turn, undoubtedly plays a part in the lighting up of quiescent pulmonary tuberculosis.

In any consideration of industrial tuberculosis it is of utmost importance that there be kept clearly in mind the economic and social factors involved. Wage levels, and standards of living probably play as large a part as any other single factor in the control of pulmonary tuberculosis.

It is encouraging to note that there has been a decline in the percentage of deaths for each of these occupations except miners (other than coal miners) between the years 1911 to 1913 and 1922 to 1924. These occupations have shared in the phenomenal decline in the mortality rate from tuberculosis which has occurred among men of the working ages during the last fifteen years. In the age group 20 to 44, the tuberculosis deathrate among white male industrial wage earners is only one-third of what it was in 1911.

AUTOMOBILE FATALITIES IN THE URBAN INDUSTRIAL POPULATIONS OF AMERICAN STATES AND CANADIAN PROVINCES, 1927

In the January STATISTICAL BULLETIN we announced that the deathrate for automobile fatalities had risen, in 1927, to a new maximum. This was the culmination of a continuously increasing deathrate over a long series of years. Three out of every ten fatal accidents of all kinds in the industrial populations of the United States and Canada, last year, resulted from the operation of motor vehicles. Furthermore, reports for the five elapsed months of 1928 show that this type of accidents is occurring even more frequently than in 1927. Thus the situation is going from bad to worse with no indication whatever that a turn for the better is in sight.

Obviously, much interest attaches to the distribution of automobile fatalities throughout the United States and Canada. We are now able to supplement the facts published in January by showing similar data for more than 18,000,000 Metropolitan Industrial policyholders in the several states and the Canadian Provinces.

Rates are shown for both the white and colored policyholders, and there is not much difference in the gravity of the situation in the two races. The deathrate for the negro policyholders in the United States, in 1927, was 17.2 per 100,000, as compared with 19.1 for the white. If it were possible to give separate figures for those killed by being *struck* by automobiles, it might well develop that more negroes than whites, per 100,000 exposed to risk, lose their lives in this type of accident. Furthermore, the automobile deathrate has been increasing more rapidly in recent years among the negroes than among the whites. Comparison with a similar study for 1923 shows a 32 per cent. rise for the former, as compared with only 16 per cent. for the latter.

Another interesting item brought out in the table on page 7 is the deathrate for Canada. While this is still only a little more than half that for the United States, it has been increasing more rapidly in recent years, and automobile fatalities have become one of the important causes of death in several Canadian Provinces.

In the United States, the Mountain States and the South Atlantic region show the highest deathrate from this cause, closely followed by the Pacific Coast and the East North Central and East South Central groups. The rates for all other sections are below the average for the country, with the lowest figures in the West South Central States and in New England.

Automobile Accidents. Deathrates per 100,000 Persons Exposed. All Ages, by Geographic Division, State and Province. Metropolitan Life Insurance Company, Industrial Department, 1927.

Geographic Division	Deathrates per 100,000	
	White	Colored
Total Company	18.6[1]	17.2
United States	19.1[2]	17.2
New England	15.4	8.5
Maine	18.4	†
New Hampshire	13.4	†
Vermont	16.5	†
Massachusetts	14.5	†
Rhode Island	13.7	14.4
Connecticut	17.8	17.9
Middle Atlantic	18.7	15.3
New York	16.8	14.9
New Jersey	22.4	17.5
Pennsylvania	20.4	14.6
East North Central	21.2	19.3
Ohio	22.5	28.1
Indiana	18.5	15.1
Illinois	17.4	14.0
Michigan	29.9	30.4
Wisconsin	20.3	43.7
West North Central	17.4	10.7
Minnesota	18.6	22.7
Iowa	19.5	40.6
Missouri	14.4	8.5
Nebraska	16.3	9.2
Kansas	37.8	4.4
South Atlantic	22.0	22.7
Delaware	27.6	12.8
Maryland	22.3	10.8
Dist. of Columbia	15.8	10.9
Virginia	16.6	26.0
North Carolina	27.2	30.0
South Carolina	29.4	34.3
Georgia	19.3	17.8
South Atlantic (*Cont.*)		
Florida	31.0	50.2
West Virginia	21.6	31.3
East South Central	21.1	16.9
Kentucky	20.4	14.8
Tennessee	20.2	18.1
Alabama	21.2	17.3
Mississippi	40.1	*
West South Central	14.7	17.0
Arkansas	27.6	10.9
Louisiana	10.7	21.8
Oklahoma	14.3	†
Mountain	22.0	†
Montana	12.3	†
Idaho	62.4	†
Colorado	29.7	†
Utah	14.2	†
Pacific	21.7	21.7
Washington	20.4	29.6
Oregon	20.2	†
California	22.2	21.5
Canada	10.9[3]	†
Eastern Provinces	11.4	†
Nova Scotia	8.4	†
New Brunswick	19.1	†
Quebec	9.6	†
Ontario	13.7	†
Western Provinces	6.0	†
Manitoba	†	†
Saskatchewan	†	†
Alberta	8.7	†
British Columbia	11.1	†

*Not calculated on account of small number of colored policyholders.

†No deaths.

[1]Includes 6 deaths of white policyholders outside United States and Canada.

[2]Includes 7 deaths of white policyholders in states not tabulated above.

[3]Includes deaths in provinces not tabulated above.

It is interesting to note that, despite the immense motor vehicle traffic of the cities of New York State, the deathrate for that Commonwealth is well below the average both for the country and for the adjacent states of Connecticut, New Jersey and Pennsylvania. Other states with outstandingly high deathrates from this cause, among their urban industrial population, were Idaho, Mississippi, Kansas, Florida, Michigan, South Carolina, Arkansas, Delaware, and North Carolina.

HEALTH RECORD FOR MAY, 1928

Weather conditions during April and May were, in large part, unseasonable, and the unusually "late spring" of this year was possibly a factor in the high deathrate for May. Among the more than 18,000,000 Industrial policyholders of the Metropolitan Life Insurance Company, the May deathrate was 10.4 per thousand. This is the highest mortality figure on record for any May since 1919, when the effects of the great influenza pandemic of 1918-1919 were still being felt. There was a rise this year of nearly 20 per cent. over the rate for May, 1927. The expected seasonal decline which ordinarily takes place between April and May did not occur this year.

Analysis of the table on page 11 shows the extent to which abnormal weather conditions affected the mortality from some of the principal causes of death. Influenza, for which the deathrate up to the end of March had run below last year's figure, showed a considerable rise in April, with a further increase in May to a figure more than double that for the same month in 1927. The pneumonia deathrate in May was 57 per cent. higher than for the corresponding month of last year. The most pronounced rises, as compared with May of last year, were for these diseases, which are always adversely affected by a combination of low temperature and high humidity. The three principal degenerative diseases (heart disease, cerebral hemorrhage and chronic nephritis) always cause more deaths when the mortality from pneumonia is rising; and all three show May deathrates in excess of those for either April of this year or May of last. Even tuberculosis, which had shown very marked improvement during the four preceding months of 1928, registered a deathrate of 105 per 100,000, as compared with 96.4 in May, 1927.

The surprisingly high mortality in May suggests that more consideration might well be given by public health workers to the effect of such weather elements, as temperature, humidity and rainfall on the deathrate from the principal causes of death. In normal

years, it is the months of the first quarter (March, in particular) which record the highest deathrates; but this year, the May rate has exceeded that for each of the earlier months.

The May deathrate for measles (12.1 per 100,000) was unusually high and the cumulative rate for this disease up to June 9th was almost double that for the corresponding period of last year. The diphtheria deathrate showed improvement over the same month of 1927, but the year-to-date figure for this disease stands slightly higher than that for last year, and also exceeds that for the corresponding part of 1926.

The mortality from diabetes registered an increase over that for May a year ago; and, unless there is marked improvement in the latter half of 1928, this disease will record its highest deathrate over a long series of years.

Suicides were considerably more numerous than in May of 1926 and 1927. Fatal accidents also increased and the automobile accident deathrate was 21.5 per cent. above that for May, 1927.

The general deathrate for the large cities of the United States in May was 14.8 per thousand estimated population. This is about the same as for the previous month, but much above the figure for May, 1927 (12.8). As compared with April, there was greater prevalence in May of poliomyelitis and typhoid fever, with fewer cases of diphtheria, influenza, measles, scarlet fever and smallpox. Comparison with May, 1927, shows more reports of influenza, measles, poliomyelitis and smallpox with fewer cases of diphtheria, scarlet fever and typhoid fever.

Although influenza was slightly less prevalent in May than in April, about three times as many cases were reported from 23 states as for May a year ago. This disease appears to be becoming more prevalent in Massachusetts, Connecticut, New Jersey and West Virginia. Furthermore, accident and health underwriters of the Middle West report that influenza claims are being filed with sufficient regularity to denote that the disease is causing much sickness.

Reports of poliomyelitis cases from 41 states numbered 96 in May, as compared with 82 in April. In New York, the increase was from 3 cases to 14; in South Carolina, from 2 to 7, and in California, from 16 to 23.

Among the prominent health activities of the month the following may be mentioned: The MONTREAL HEALTH DEPARTMENT has been reorganized with new appointments to the staff and an additional appropriation of $150,000. The SIXTH ANNUAL OHIO STATE CON-

FERENCE FOR SOCIAL WORK AMONG NEGROES was held at Akron. The JOHNS HOPKINS HOSPITAL at Baltimore announced that a clinic is about to be opened for diagnosis only, especially for persons of moderate means. The maximum charge will be $25, and, in most cases, the fee will be only $10. The new clinic has an endowment of $2,000,000 from the CARNEGIE FOUNDATION. Plans for a five-year program of research by a committee of physicians, sanitarians, economists and laymen, with a view to ascertaining how a family of moderate means can secure adequate medical attention, were announced. The investigation will be conducted jointly by the AMERICAN MEDICAL ASSOCIATION, the Metropolitan Life Insurance Company, the UNITED STATES PUBLIC HEALTH SERVICE and other agencies. The MILBANK MEMORIAL FUND, The RUSSELL SAGE FOUNDATION and the TWENTIETH CENTURY FUND are giving this undertaking financial support. A state-wide survey to locate all the crippled children in Minnesota is being planned by the MINNESOTA ASSOCIATION FOR CRIPPLED CHILDREN. Three outbreaks of infantile paralysis, the first in 1916, have affected from 2,500 to 3,000 children in that state, leaving many of them more or less crippled. A Minnesota law provides state aid to the extent of $250 annually for the education of each crippled child discharged from the hospitals, but unable to attend the regular schools. An Institute on Neo-natal Mortality was held at Newark, New Jersey, under the leadership of Dr. JULIUS LEVY of the State Department of Health. One of its most interesting features was the presentation of diplomas to midwives who had completed a post-graduate course at the JERSEY CITY HOSPITAL. This is believed to be the first post-graduate course for midwives in either the United States or Europe. Oklahoma was admitted to the Birth and Death Registration Areas.

The following table shows the mortality among the Industrial policyholders for May, 1928; April, 1928, May 1927, and the year 1927.

METROPOLITAN LIFE INSURANCE COMPANY

Deathrates* per 100,000 for Principal Causes, Premium-paying Business in Industrial Department (Annual Basis)

MONTHS OF MAY, 1928; APRIL, 1928, AND OF MAY, 1927

CAUSES OF DEATH	RATE PER 100,000 LIVES EXPOSED*			
	May, 1928	Apr. 1928	May, 1927	Year 1927†
TOTAL—ALL CAUSES	1038.1	996.9	874.8	885.4
Typhoid fever	2.0	1.4	5.2	4.6
Measles	12.1	10.2	7.5	4.1
Scarlet fever	3.1	4.4	3.5	3.1
Whooping Cough	6.9	6.1	6.5	6.4
Diphtheria	9.1	9.3	10.6	10.5
Influenza	38.6	35.4	18.7	17.7
Tuberculosis (All forms)	105.0	94.8	96.4	93.3
Tuberculosis of resp'y system	92.5	83.8	81.5	81.7
Cancer	76.6	75.0	68.4	74.0
Diabetes mellitus	19.8	18.0	16.0	16.7
Cerebral hemorrhage	62.2	59.5	49.3	54.9
Organic diseases of heart	159.3	151.8	130.8	132.2
Pneumonia (All forms)	132.5	140.6	84.3	77.6
Other respiratory diseases	20.8	19.3	16.3	15.4
Diarrhea and enteritis	15.4	15.8	17.7	24.5
Bright's disease (Chronic nephritis)	75.8	74.5	70.1	69.3
Puerperal state	14.5	15.2	14.7	15.4
Suicides	9.1	8.2	7.6	8.3
Homicides	7.6	5.6	7.6	7.2
Other external causes (excluding suicides and homicides)	56.9	53.4	53.6	63.7
Traumatism by automobiles	15.8	15.3	13.0	18.3
All other causes	210.8	198.4	189.8	186.7

*All figures include infants insured under one year of age.

†Based on provisional estimate of lives exposed to risk in 1927.

Correspondence on the subjects discussed in these BULLETINS may be addressed to: The Editor,

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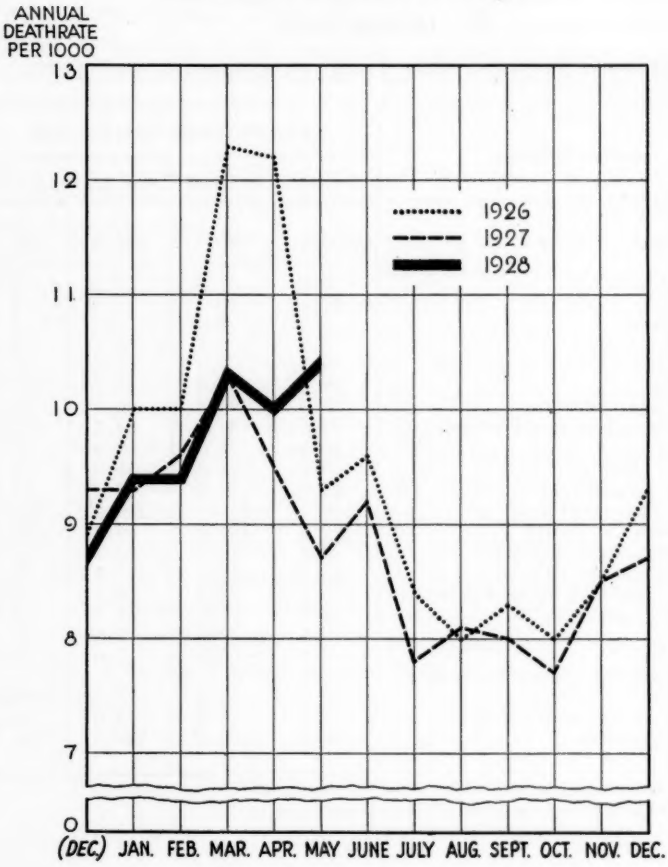
Deathrates from All Causes

METROPOLITAN LIFE INSURANCE CO.
INDUSTRIAL DEPARTMENT



1926	10.0	10.0	12.3	12.2	9.3	9.6	8.4	8.0	8.3	8.0	8.5	9.3
1927	9.3	9.6	10.3	9.5	8.7	9.2	7.8	8.1	8.0	7.7	8.5	8.7
1928	9.4	9.4	10.3	10.0	10.4							

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